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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/079,291	02/19/2002	Kazuya Ono	NIKOP028, PA0440, 00/0464	6613

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EXAMINER
MILLER, PATRICK L

ART UNIT	PAPER NUMBER
2837	

DATE MAILED: 04/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/079,291	Applicant(s) ONO ET AL.	
	Examiner Patrick Miller	Art Unit 2837	

-- The MAILING DATE of this communication appears on th cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-33 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,5,7,10,11,14,15,18,20,23,24 and 27-33 is/are rejected.

7)☒ Claim(s) 3,4,6,8,9,12,13,16,17,19,21,22,25 and 26 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 19 February 2002 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosur Stat ment(s) (PTO-1449) Paper No(s) 1 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 2, 14, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Akutsu et al. (5,701,041) [first embodiment].

   - With respect to claims 1 and 14, Akutsu et al. disclose a method and apparatus for providing support between a first structure (Fig. 2, #6) and a second structure (Fig. 2, #1) comprising: providing a supporting member mounted to the first structure and second structure, where the supporting member has positive stiffness with respect to a direction that differs from a support direction of the apparatus (Fig. 1, #4); a first section having at least one magnetic member and the first section being *coupled* to the first structure (Fig. 2, #10 has magnetic member #9 and coupled to #6); a second section having at least one magnetic member and the second section being *coupled* to the second structure (Fig. 2, #'s 11 and 7 have magnetic member #8 and are coupled to #1); and the first and second sections present negative stiffness caused by magnetic force, thereby canceling out a part of the positive stiffness of the supporting member (Col. 2, lines 1-9; forces in z and y directions).

- With respect to claims 2 and 15, the supporting member has a bellow (Fig. 2, #14) that includes an airtight cavity (Fig. 2, #16), and the airtight cavity is pressurized (Col. 3, lines 52-54; Col. 4, lines 31-45).

2. Claims 1, 2, 5, 14, 15, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Akutsu et al. (5,701,041) [second embodiment].

- NOTE: This rejection using Akutsu et al. is different from the previous rejection in that the second embodiment of Akutsu et al. is used (Figure 9).
- Akutsu et al. disclose a method and apparatus for providing support between a first structure (Fig. 9, #1) and a second structure (Fig. 9, #32) comprising: providing a supporting member mounted to the first structure and second structure, where the supporting member has positive stiffness with respect to a direction that differs from a support direction of the apparatus (Fig. 9, #'s 16, 33, 34); a first section having at least one magnetic member and the first section being *coupled* to the first structure (Fig. 9, magnetic member #28 coupled to #1); a second section having at least one magnetic member and the second section being *coupled* to the second structure (Fig. 9, magnetic member #29 coupled to #32); and the first and second sections present negative stiffness caused by magnetic force, thereby canceling out a part of the positive stiffness of the supporting member (Col. 5, lines 28-42).
- With respect to claims 2 and 15, the supporting member has a bellow (Fig. 9, #34) that includes an airtight cavity (Fig. 9, #16), and the airtight cavity is pressurized (Col. 5, lines 43-54).

- With respect to claims 5 and 18, the first section has a first cylindrical magnet member, the second section has a second cylindrical magnet member, and said members face each other at an end so the device is in a neutral position (Col. 5, lines 34-37).

3. Claims 29-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Ono (5,780,943).

- With respect to claims 29, Ono discloses a lithography system (Col. 1, lines 15-16) comprising: an illumination system that irradiates radiant energy (Col. 5, lines 5-7); a positioning apparatus that disposes a substrate on a path of the radiant energy (Col. 5, lines 7-33); a system that provides support between a first structure (Fig. 6, #20) and a second structure (Fig. 6, #22); the system including, a supporting member (Fig. 6, # 32a/c) mounted to the first structure and the second structure and having positive stiffness with respect to a first direction (Col. 5, lines 34-41); a first section having at least one magnet member, and the first section being coupled to the first structure (Fig. 6, #'s 44, 46 coupled to #20); a second section having at least one magnet member, and the second section being coupled to the second structure (Fig. 6, #38 coupled to #22); and the first and second sections present negative stiffness caused by magnetic force, thereby canceling at least part of the positive stiffness of the supporting member (Col. 3, lines 36-56).
- With respect to claim 30, the system further comprises at least one actuator (Fig. 6, # 36a/b), wherein the driving force of the actuator and the support force generated by the system lie on the same axis (Col. 5, lines 44-51 same axis as Col. 5, lines 55-67).
- With respect to claim 31, the support force generated by the system is substantially perpendicular to the first direction. Specifically, the magnets and actuators exert force in

the z-direction. The springs exert force in three directions, which would make the "z-force" substantially perpendicular to the x and y directions, respectively; Col. 5, lines 37-41).

- With respect to claims 32 and 33, an object is manufactured with the lithography system, wherein the object is a wafer on which an image has been formed (Col. 5, lines 1-10).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 7, 10, 20, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akutsu et al. (5,777,403) [first embodiment] as applied to claims 1, 2, 14, and 15 above, and further in view of Yuan (5,777,403).

- Akutsu et al. teach all of the limitations of claims 1, 2, 14, and 15 above, and additionally disclose the first section having a first magnetic member (Fig. 2, #9), the second section having a second magnetic member (Fig. 2, #8), and the first magnetic member is provided within the second magnetic member (Fig. 2, #9 inside of #8) [claims 7 and 20]. Akutsu et al. further disclose the first section having a first magnetic member (Fig. 2, #9), the second section has second and third magnetic members (Fig. 2, #8 is comprises an upper and lower magnet, respectively), and the first magnetic member provided within the second and third magnetic members (Fig. 2, #9 within #8) [claims 10 and 23].
- Akutsu et al. do not disclose the magnetic members being cylindrical.

- Yuan disclose a voice coil motor configured with cylindrical magnets and a cylindrical coil (Fig. 4A, #'s 23, 26). The motivation for using cylindrical magnetic members is to provide a more uniform force. This provides the advantage of a more stable and reliable support.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to modify the apparatus of Akutsu et al. with cylindrical magnetic members, thereby providing the advantage of a more stable and reliable support, as taught by Yuan.

5. Claims 11 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akutsu et al. and Yuan as applied to claims 1, 2, 10, 14, 15, and 23 above, and further in view of Okada (6,417,583).
   - Akutsu et al. and Yuan teach all of the limitations of claims 1, 2, 10, 14, 15, and 23 above, but with respect to claims 11 and 24, do not disclose the first magnetic member including a retentive magnetic material and the second and third magnetic members including a non-retentive magnetic material.
   - Okada discloses a linear actuator where the configuration is reversed from that of Akutsu et al. and Yuan. Specifically, coils (now defined as the second and third magnetic member) (Fig. 1, #131, 132) surround the magnets (now defined as the first magnetic member) (Fig. 1, #141, 142). This now makes the newly defined first magnetic material retentive and the second and third magnetic materials non-retentive, respectively. Okada's motivation for providing this configuration is so thrust is kept sufficiently due to

an effectively obtained magnetic force. This provides the advantage of making the structure lightweight and the ability to realize a higher acceleration (Col. 1, lines 45-53).

- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to configure the magnetic members of Akutsu et al. and Yuan as disclosed by Okada, wherein the first magnetic member is retentive and the second and third magnetic members are non-retentive. This provides the advantage of creating a lightweight structure and the ability to realize a higher acceleration, as taught by Okada.

6. Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akutsu et al. (5,777,403) as applied to claim 14 above.

- Akutsu et al. teach all of the limitations of claim 14 above, but with respect to claims 27 and 28, do not explicitly disclose a method of making an object/wafer using a lithography process using the supporting method of claim 14.
- Akutsu et al. do disclose mounting a wafer on the top surface of a tilting stage. A person of ordinary skill in the art would recognize that a lithography process could be used on an object/wafer when the wafer is positioned on a tilting stage as disclosed. This provides the advantage of allowing the object/wafer to be positioned more precisely or the lithography to be done while the object/wafer is at a slight angle.
- Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention that the apparatus of Akutsu et al. could be used in a method for making an object/wafer using a lithography process, thereby providing the advantage of allowing the object/wafer to be positioned more accurately and performing lithography at an angle, as taught by Akutsu et al.

Allowable Subject Matter

7. Claims 3, 4, 6, 8, 9, 12, 13, 16, 17, 19, 21, 22, 25, and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

- With respect to claims 3, 4, 16, and 17, the Prior Art does not disclose permanent magnet configurations for a support located inside an airtight bellow.
- With respect to claims 6 and 19, the Prior Art discloses the first part with a retentive magnetic material and the second part with a non-retentive magnetic material; however, the Prior Art does not disclose both parts having retentive magnetic materials.
- With respect to claims 8 and 21, the Prior Art does teach two magnetic members that are made from retentive material (Ono 5,780,943); however the Prior Art does not teach or suggest combining this feature with the apparatus of Akutsu et al. (5,777,403) [first embodiment] and Yuan.
- With respect to claims 9 and 22, Okada (6,417,583) does teach a linear actuator with a first magnetic member being made from retentive material and a second magnetic member being non-retentive. However, the configuration of Okada contradicts claims 7 and 20, where the first magnetic member is located within the second magnetic member.
- With respect to claims 12 and 25, the Prior Art does not teach adding second, third, fourth, and fifth magnetic members.

Prior Art of Record

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Watanabe et al. (5,765,800) disclose a vibration damping system with an airtight below that is pressurized, and a plurality of electromagnets.
- Okada (6,417,583) discloses a linear actuator with a coil member that surrounds magnetic members.
- Hara (6,512,571) discloses an anti-vibration system for lithography with an air support and electric actuators.
- Murakami et al. (JP 05-263871 A) disclose an air spring support with a pressurized chamber and a magnetic member attached to a bottom structure.
- Morimotor (6,514,377) discloses an apparatus and method for processing an object with an airtight bellow.
- Miyajima et al. (JP 11-041900 A) discloses a voice coil motor with an airtight casing.
- Chitavat (4,798,985) discloses a linear motor with an airlift bearing.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick Miller whose telephone number is 703-308-4931. The examiner can normally be reached on 8:30-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Nappi can be reached on 703-308-3370. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-306-3431.

Patrick Miller
Examiner
Art Unit 2837

pm
April 2, 2003

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